

WHAT IS CLAIMED IS:

1. A resource brokering system for use with a wireless
2 communication cell having at least one aperture array, comprising:

3 a virtual sector broker configured to generate, in response to
4 a resource request, an allocation request based on available
5 wireless communication resources of said cell subjected to a
6 brokering process;

7 an internal policy broker database associated with said
8 virtual sector broker; and

9 a virtual sector formation unit configured to employ said at
10 least one aperture array to provide dynamic virtual sectorization
11 of said available wireless communication resources in response to
12 said allocation request.

2. The resource brokering system as recited in Claim 1
2 wherein said available wireless communication resources include one
3 selected from the group consisting of:
4 beam pattern specification,
5 spectrum-on-demand,
6 dynamic provisioning or excess spectrum capacity sales,
7 channel access brokering, and
8 multiple objective optimization schemes using said available
9 wireless communication resources across a plurality of cell sites
10 or sectors within a cell site.

3. The resource brokering system as recited in Claim 1
2 wherein said virtual sectorization includes substantially
3 simultaneously forming dynamically assigned beam patterns.

4. The resource brokering system as recited in Claim 1
2 wherein said wireless communication resources are selected from the
3 group consisting of:
4 a spectrum,
5 a code modulation,
6 a beam pattern,
7 a spatial directionality,
8 a power,
9 a time interval, and
10 jointly optimized combinations thereof.

5. The resource brokering system as recited in Claim 1
2 wherein said virtual sector formation unit is further configured to
3 receive and send signals of various forms from at least one
4 wireless service provider via a transport network and perform
5 up/down conversions of said signal forms.

6. The resource brokering system as recited in Claim 1
2 wherein said wireless communication cell has at least two aperture
3 arrays and said virtual sector formation unit is dynamically
4 coupleable to said at least two aperture arrays via an optical
5 network, said virtual sector formation unit further configured to
6 employ said optical network to steer communication signals
7 dynamically to different ones of said at least two aperture arrays
8 in response to said allocation request.

7. The resource brokering system as recited in Claim 1
2 wherein said virtual sector broker is further configured to
3 generate said allocation request based on said available wireless
4 communication resources of a plurality of said wireless
5 communication cells.

8. The resource brokering system as recited in Claim 1
2 wherein said resource brokering system is employed over a region
3 having a plurality of wireless communication cells, said brokering
4 process including deterministic and statistical determinations of
5 allocations of said available wireless communication resources over
6 said region based on a restriction of cost, time, usage or
7 coverage.

9. A method of brokering resources of a wireless
2 communication cell having at least one aperture array, comprising:
3 generating, in response to a resource request, an allocation
4 request based on available wireless communication resources of said
5 cell subjected to a brokering process; and
6 employing said at least one aperture array to provide dynamic
7 virtual sectorization of said available wireless communication
8 resources in response to said allocation request.

10. The method as recited in Claim 9 wherein said available
2 wireless communication resources include one selected from the
3 group consisting of:

4 beam pattern specification,
5 spectrum-on-demand,
6 dynamic provisioning or excess spectrum capacity sales,
7 channel access brokering, and
8 multiple objective optimization schemes using said available
9 wireless communication resources across a plurality of cell sites
10 or sectors within a cell site.

11. The method as recited in Claim 9 wherein said virtual
2 sectorization includes substantially simultaneously forming
3 dynamically-assigned beam patterns.

12. The method as recited in Claim 9 wherein said wireless
2 communication resources are selected from the group consisting of:
3 a spectrum,
4 a code modulation,
5 a beam pattern,
6 a spatial directionality,
7 a power,
8 a time interval, and
9 jointly optimized combinations thereof.

13. The method as recited in Claim 9 further comprising
2 receiving baseband signals from at least one wireless service
3 provider via an optical network and performing up/down conversion
4 of said baseband signals.

14. The method as recited in Claim 9 wherein said wireless
2 communication cell has at least two aperture arrays coupled to an
3 optical network, said method further comprising employing said
4 optical network to steer communication signals dynamically to
5 different ones of said at least two aperture arrays in response to
6 said allocation request.

15. The method as recited in Claim 9 wherein said generating
2 including generating said allocation request based on said
3 available wireless communication resources of a plurality of said
4 wireless communication cells.

16. The method as recited in Claim 9 wherein said method is
2 employed over a region having a plurality of wireless communication
3 cells over a region, said brokering process including providing
4 statistical determination of allocations of said available wireless
5 communication resources over said region based on a restriction of
6 cost, time, usage or coverage.

17. A wireless communication network, comprising:

2 a plurality of wireless communication cells, each of said
3 plurality of cells having at least one aperture array coupled to an
4 optical network;

5 a plurality of wireless service provider systems coupled to
6 said optical network; and

7 a resource brokering system that receives resource requests
8 from said plurality of wireless service providers, including:

9 a virtual sector broker configured to generate, in
10 response to a resource request, an allocation request based on
11 available wireless communication resources of said cell
12 subjected to a brokering process,

13 an internal policy broker database associated with said
14 virtual sector broker,

15 a virtual sector formation unit configured to employ said
16 at least one aperture array to provide dynamic virtual
17 sectorization of said available wireless communication
18 resources in response to said allocation request,

19 a per service provider broker agent,

20 a per resource provider broker agent,

21 a plurality of aperture array, and

22 opportunistic measurement functional unit.

18. The wireless communication network as recited in Claim 17
2 wherein said available wireless communication resources include one
3 selected from the group consisting of:
4 beam pattern specification,
5 spectrum-on-demand,
6 dynamic provisioning or excess spectrum capacity sales,
7 channel access brokering, and
8 multiple objective optimization schemes using said available
9 wireless communication resources across a plurality of cell sites
10 or sectors within a cell site.

19. The wireless communication network as recited in Claim 17
2 wherein said virtual sectorization includes substantially
3 simultaneously forming dynamically assigned beam patterns.

20. The wireless communication network as recited in Claim 15

2 wherein said wireless communication resources are selected from the
3 group consisting of:

4 a spectrum,

5 a code modulation,

6 a beam pattern,

7 a spatial directionality,

8 a power,

9 a time interval, and

10 jointly optimized combinations thereof.

21. The wireless communication network as recited in Claim 15

2 wherein said virtual sector formation unit further receives
3 baseband signals from said plurality of wireless service provider
4 systems and performs up/down conversions of said baseband signals.

22. The wireless communication network as recited in Claim 15

2 wherein said virtual sector formation unit dynamically coupleable
3 to said at least one aperture array of each of said plurality of
4 cells via said optical network, said virtual sector formation unit
5 employing said optical network to steer communication signals
6 dynamically to different ones of said at least one aperture array
7 or each of said plurality of cells in response to said allocation
8 requests.

23. The wireless communication network as recited in Claim 15
2 wherein said plurality of cells is employed over a region and said
3 brokering process includes statistical determination of allocations
4 of said available wireless communication resources over said region
5 based on a restriction of cost, time, usage or coverage.